

NUISANCE PROBLEMS AT GWINNETT COUNTY'S YELLOW RIVER WATER RECLAMATION FACILITY

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INTRODUCTION

Due to the expanding population, the rapid depletion of land resources and the increasing cost of transporting wastewater, municipalities today are faced with an increasing challenge to avoid adversely impacting neighboring communities. Municipalities traditionally built wastewater treatment facilities many miles from concentrated population centers with a large buffer zone between them and their closest neighbor. Today these buffers are being eliminated by the encroachment of commercial and residential communities and some plants are actually being planned and built in the midst of these communities. This is the environment which exists at the Yellow River Water Reclamation Facility in Lilburn, Georgia.

DISCUSSION

The Yellow River Facility was constructed as a 6 MGD advanced activated sludge wastewater treatment plant in November 1982. In July 1989 the plant was upgraded to 12 MGD. It is located in the middle of four subdivisions. Three of these subdivisions were in existence with the fourth under construction when the plant was first built. Complaints from these subdivisions began almost immediately. These complaints can be classified into three broad categories: 1) Noise, 2) Odor, and 3) Aesthetics.

Noise. Prior to 1986 noise was the major complaint of the surrounding communities and was given the highest priority by Gwinnett County. Noise studies were conducted on six separate occasions in order to identify specific sources and recommend solutions for abatement (Table 1).

TABLE 1. Noise Studies

Consultant	Date	Site 1	Site 2
Ga. Tech. E.E.S.	June 1983	60.2 dBA	59.5 dBA
Environmental- Science, Inc.	April 1986	55.3 dBA	
C. R. Bragdon and Associates	June 1987	51.3 dBA	51.4 dBA
C. R. Bragdon and Associates	April 1989	52.0 dBA	51.9 dBA
C. R. Bragdon and Associates	Sept. 1990	49.7 dBA	
		<u>Site 3</u>	<u>Site 4</u>
C. R. Bragdon and Associates	June 1987	49.8 dBA	54.5 dBA
C. R. Bragdon and Associates	April 1989	52.6 dBA	49.5 dBA
C. R. Bragdon and Associates	Sept. 1990	53.8 dBA	

Site 1 = Riverbend Drive, Site 2 = Wentworth Lane

Site 3 = Guys Court, Site 4 = Vineyard Way

All noise levels listed are Twenty-four hour equivalent noise levels (Leq(24))

Test results indicate that plant noise levels did not exceed the noise regulations, standards, or criteria for residential areas as developed by other federal, state, and local governmental agencies (Table 2).

TABLE 2. Noise Criteria Developed by Other Agencies

Agency	Criteria Not to exceed:
Federal Interagency Committee on Urban Noise, Environmental Protection Agency (EPA), U.S. Dept. of Housing and Development (HUD).	65 dBA(Ldn)
U.S. Department of Transportation, Federal Highway Administration (FHWA)	57 dBA for tracts on which serenity and quiet are of extraordinary significance
City of Atlanta	60 dBA for residential
DeKalb County	60 dBA for residential
Chatham County	60 dBA 7AM to 10PM 55 dBA 10PM to 7AM
American National Standards Institute, Acoustical Society of America	55 dBA(Ldn)

The results did show that noise levels exceeded normal background noise of the community. It is this which was considered unacceptable by some people. This led to one consultant recommending the adoption of a noise standard which would represent the most restrictive ordinance in the state of Georgia, and possibly the United States (Table 3).

Many corrective measures were implemented to reduce noise to a level acceptable to the community (Table 4). There has not been a noise complaint submitted since January 1990.

TABLE 3. Recommended Noise Levels for Yellow River

Exceedence	A-weighted level	C-weighted level
10% of time	50 dBA	55 dBA
50% of time	45 dBA	50 dBA
90% of time	40 dBA	45 dBA

TABLE 4. Noise Abatement Measures

Operational

1. Eliminated public address system (1984).
2. Changed chemical delivery schedule (1984).
3. Reduced generator run time (1984).
4. Changed from gas to electric carts (1984).
5. Diverted septage trucks to Crooked Creek WRF(1987).

Other

1. Piped effluent directly into river (1984).
2. Added sound absorbing baffles to generator room (1984).
3. Added a baffle wall to the generator area(1987).
4. Changed generator cooling from air to liquid cooled (1987).
5. Added a lime blower; placed in a sound proof room (1987).
6. Eliminated drying bed activity with construction of dewatering building (1988).
7. Took equalization basin out of service (1988).
8. Placed solid grating over distribution boxes (1989).
9. Built covers for sample pumps (1989).
10. Placed covers on aerator drives (1990).

Odor. From 1982 to 1986 the primary odor complaints were related to the smell of chlorine from the chlorine contact chamber. As the plant neared capacity the number of complaints for sewage odors increased. These odors were traced to a variety of sources. A number of consultants were utilized and their recommendations were implemented (Table 5). Although these measures significantly reduced odors, they were not eliminated, and this was unacceptable to the community.

TABLE 5. Odor Control Abatement

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- I. Consultants
 - A. Engineering-Science, Inc., Atlanta, Georgia.
 - B. Hensley-Schmidt, Atlanta, Georgia.
 - C. Jordan, Jones, and Goulding, Atlanta, Georgia.
 - II. Chemical Additions
 - A. To the Influent Waste Stream (1984 - 1987).
 - 1. Chlorine
 - 2. Ferrous sulfate
 - 3. Potassium permagnate
 - 4. Sodium nitrate
 - B. Fogged headworks with masking and neutralizing agents (1984-1987).
 - C. Added lime and chlorine to dumpsters and drying beds (1984-1987).
 - III. Other Measures
 - A. Operational
 - 1. Diverted septage trucks to Crooked Creek (1987).
 - 2. Took equalization basin out of service (1988).
 - 3. Took primary clarifiers out of service (1989).
 - 4. All sludge pumping moved to early morning (1989).
 - 5. Improved housekeeping in critical areas.
 - B. Construction
 - 1. Covered headworks and added a chemical wet airscrubber (1988).
 - 2. Added dewatering facility (1988).
 - 3. Covered distribution boxes with solid plates (1989).
 - 4. Currently expanding odor control facilities.
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Odor complaints are not a seasonal phenomenon. Large numbers of complaints have been logged in the months of January, March, April, June, July, October, and November. Weather is a more important factor. Mild, humid, still days are prime conditions for odor complaints. Long dry spells complicate matters by reducing flow in the sewer lines. This increases the length of time wastewater remained in the collection system and allowed it to ferment, resulting in increased odors at the headworks where the flow enters the plant.

Three major odor sources which were identified early include the headworks, the equalization basin, and the sludge drying beds. In February, 1988 construction was completed on a headworks enclosure with a chemical wet air scrubbing unit which aided in reducing odors in this section of the plant. In October, 1988 the equalization basin was taken out of service. It is now used only for storm flow control. In the same month a new dewatering

building was brought on line. Three centrifuges eliminated the need for the sludge drying beds (a temporary portable press had been in use eight months prior to the dewatering building start up).

Housekeeping became the next focus in the struggle with odor reduction after eliminating the three major contributors. The equalization basin, even though out of service, had aerator pits which needed constant attention after rains. These were eventually filled in with concrete. After the expansion, new basins not in use had to be drained and kept dry.

As new areas were identified as potential nuisance problems they were dealt with. Primary clarifiers were taken out of service, distribution boxes were covered with solid plates, scum was removed from the water surface and odor neutralizing agents were used at the dewatering building to eliminate odors produced there.

Despite the success of plant personnel and management to significantly reduce odors, the complaints from the community still persist. The Yellow River plant is currently undergoing a five million dollar expansion of it's odor control facilities. The existing 20,000 CFM chemical wet air scrubbing unit at the headworks is being replaced by two 25,000 CFM units which can be operated in series or parallel. A centrally located odor control building is being constructed with two 16,000 CFM units to scrub air from four primary clarifiers, two thickeners, the distribution boxes, and the dewatering building. The odor control systems are scheduled to start up April, 30 1991.

The number of complaints, high since 1987, has only recently shown a decline. This may be attributed in part to the current construction taking place on the odor control expansion.

Aesthetics. Some of the homes around Yellow River were in direct line of sight of the plant. An earthen berm was constructed in 1988 on the west and northwest sides of the plant to help eliminate the problem. Pine trees and a fence were placed at the top of the berm to add to the effect. Pine trees, eliagnes bushes, and magnolia trees were planted along the road entrance where the berm could not be constructed. This is one area where the county has been successful in pleasing the homeowners.

CONCLUSION

Gwinnett County is still working on finding a solution to the problems which will be acceptable to the community.

One reason for the persistence of the complaints is that of sensitivity. Many odor complaints received by the plant concern faint, transient odors which are gone by the time someone is sent to investigate it.

Another factor is both hearing and smell are not limited to the physiological response alone, but are also

filtered through the psychological system which includes a certain set of values and attitudes. These intricate systems do not respond simply or uniformly to varying degrees of noise or odors. Due to this subjectivity when a major source of noise or odor was eliminated it unmasked other noise and odors which, although different in degree and intensity, proved to be just as annoying to the residents of these satellite neighborhoods.

Wastewater treatment plants are a necessity and are here to stay. As the population increases it is going to become more necessary to place these facilities closer to dense population centers. Municipalities have to approach potential nuisance problems in the planning and design stages and incorporate them into the construction of the plant.

LITERATURE CITED

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